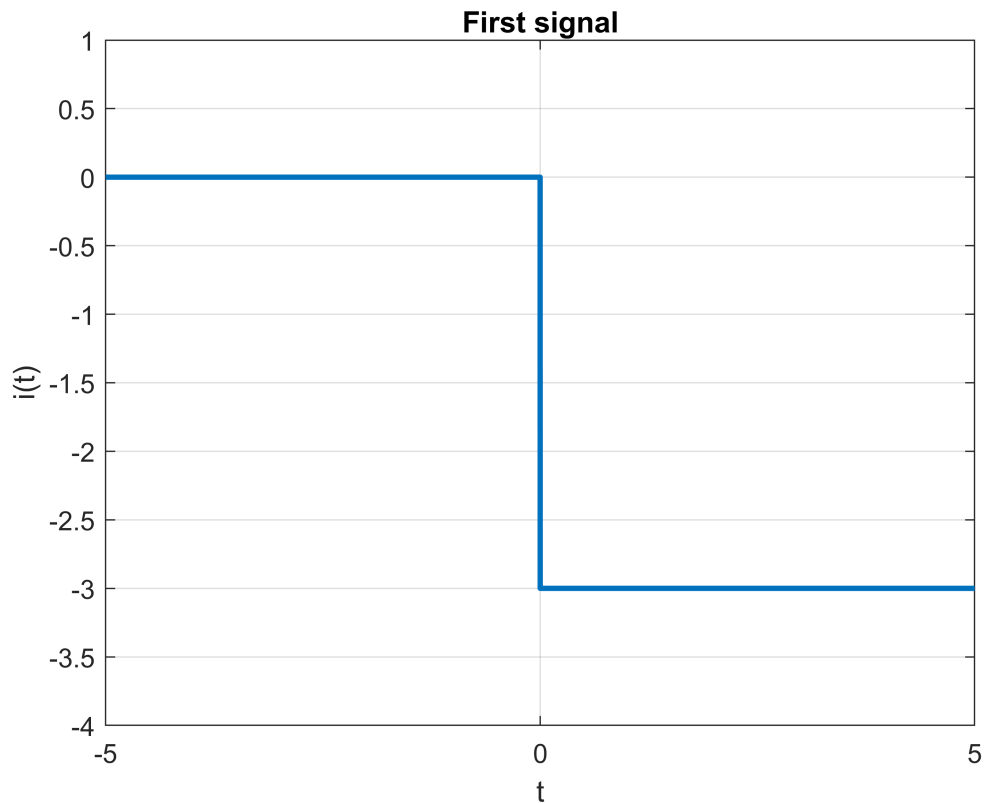```
%Ex1
%a.
clear variables;
u0 = @(t)(t>=0);
A=3;
t=-5:0.001:5;
i=-A*u0(t);
plot(t,i,'LineWidth',2);
axis([min(t),max(t),min(i)-1,max(i)+1]);
xlabel('t'); ylabel('i(t)');
title('First signal');
grid;
```
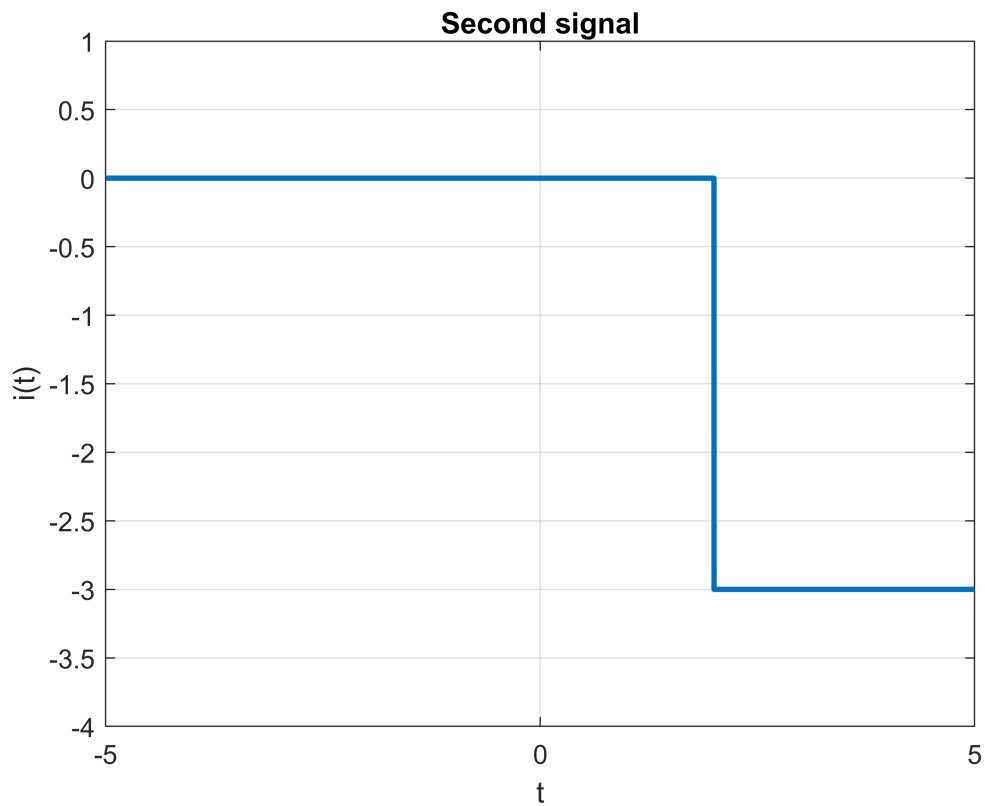


**First signal**

```
%b.
clear variables;
u0 = @(t)(t>0);
A=3;T=2;
t=-5:0.001:5;
i=-A*u0(t-T);
plot(t,i,'LineWidth',2);
axis([min(t),max(t),min(i)-1,max(i)+1]);
xlabel('t'); ylabel('i(t)');
title('Second signal');
grid;
```
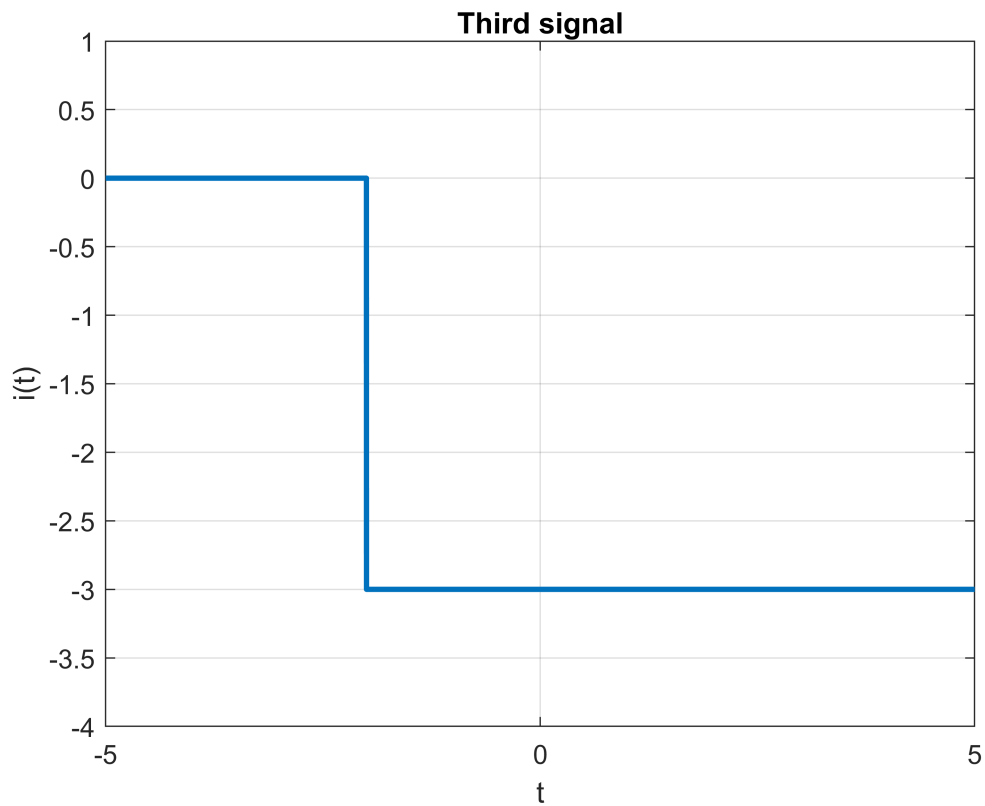
**Second signal**
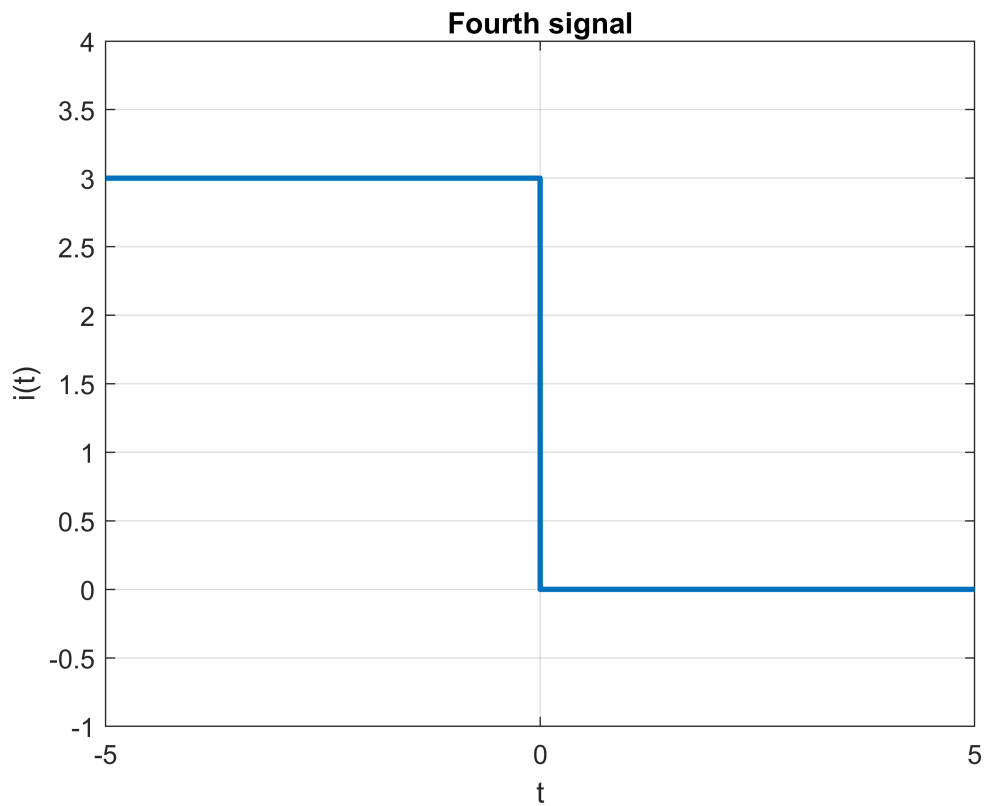
```
%c.
clear variables;
u0 = @(t)(t>0);
A=3;T=2;
t=-5:0.001:5;
i=-A*u0(t+T);
plot(t,i,'LineWidth',2);
axis([min(t),max(t),min(i)-1,max(i)+1]);
xlabel('t'); ylabel('i(t)');
title('Third signal');
grid;
```

## Third signal



```
%d.
clear variables;
u0 = @(t)(t>=0);
A=3;t=-5:0.001:5;
i=-A*u0(t)+A;
plot(t,i,'LineWidth',2);
axis([min(t),max(t),min(i)-1,max(i)+1]);
xlabel('t'); ylabel('i(t)');
title('Fourth signal');
grid;
```
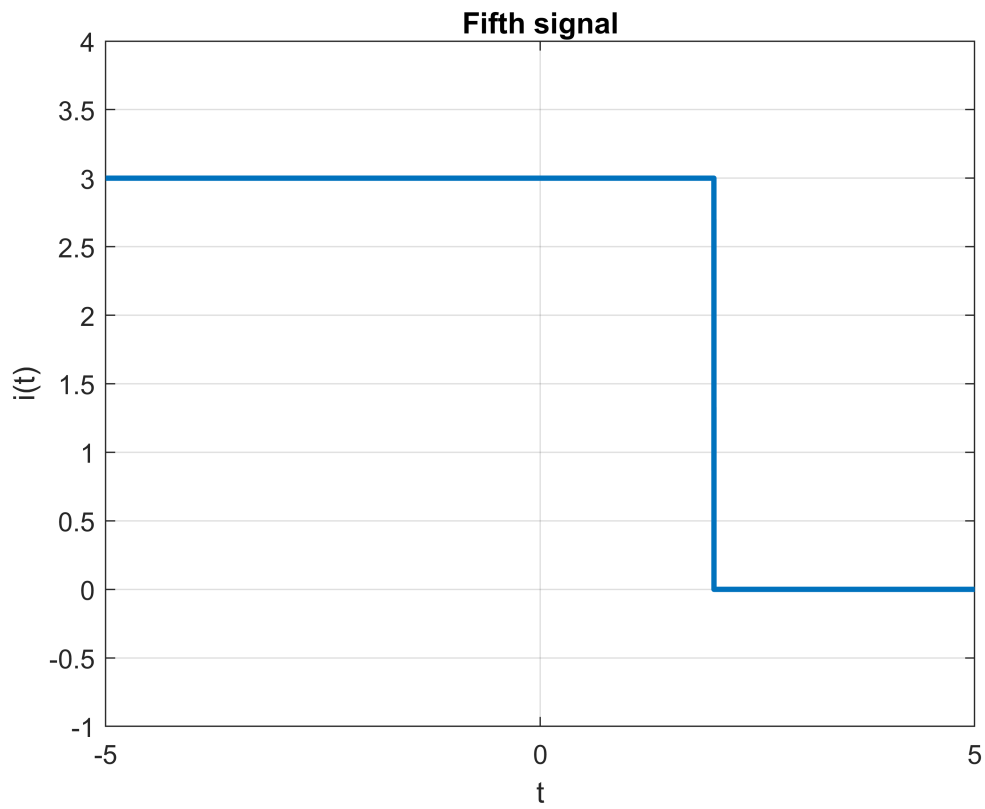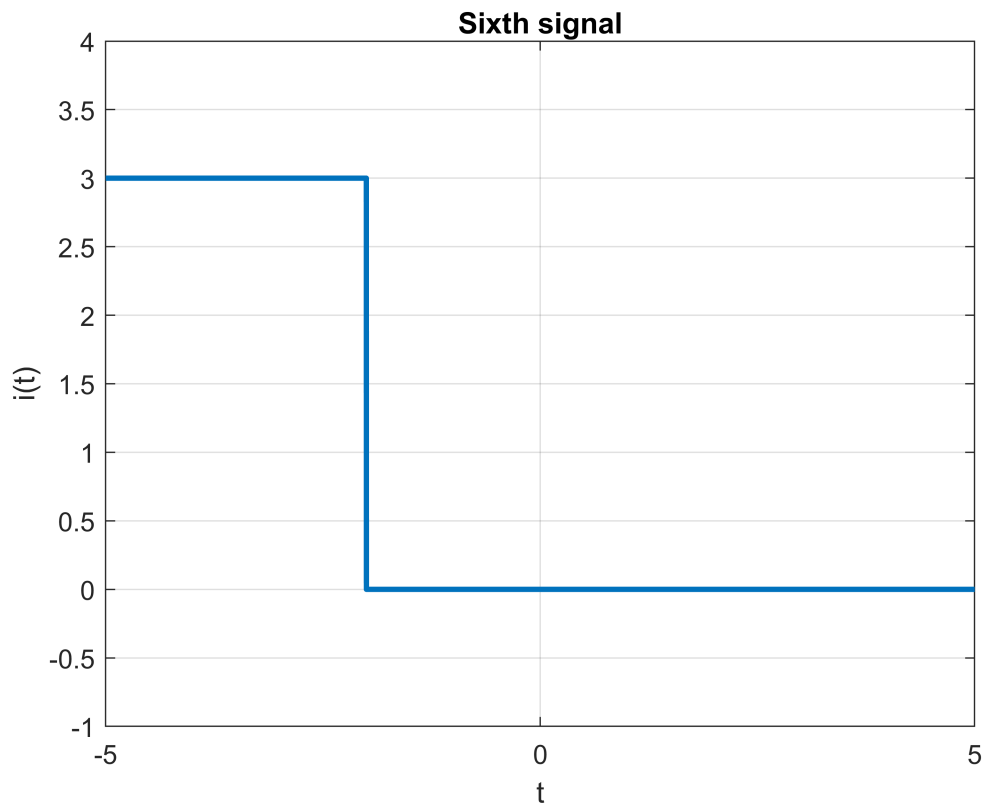
**Fourth signal**

```
%e.
clear variables;
u0 = @(t)(t>=0);
A=3;T=2;
t=-5:0.001:5;
i=-A*u0(t-T)+A;
plot(t,i,'LineWidth',2);
axis([min(t),max(t),min(i)-1,max(i)+1]);
xlabel('t'); ylabel('i(t)');
title('Fifth signal');
grid;
```
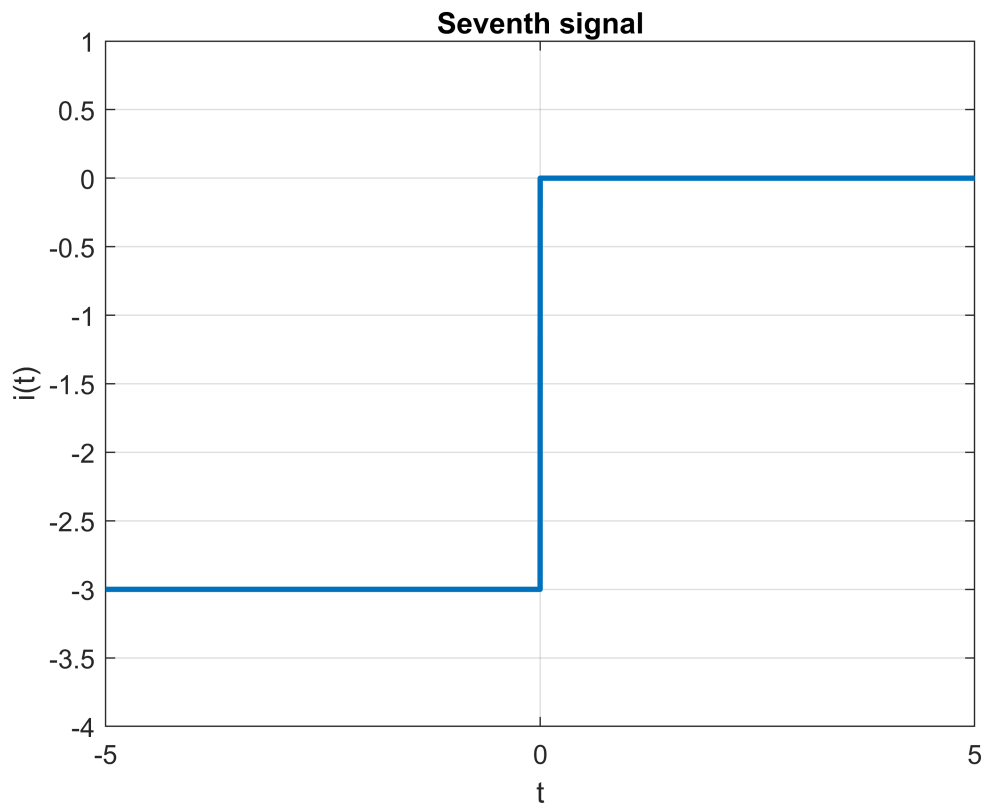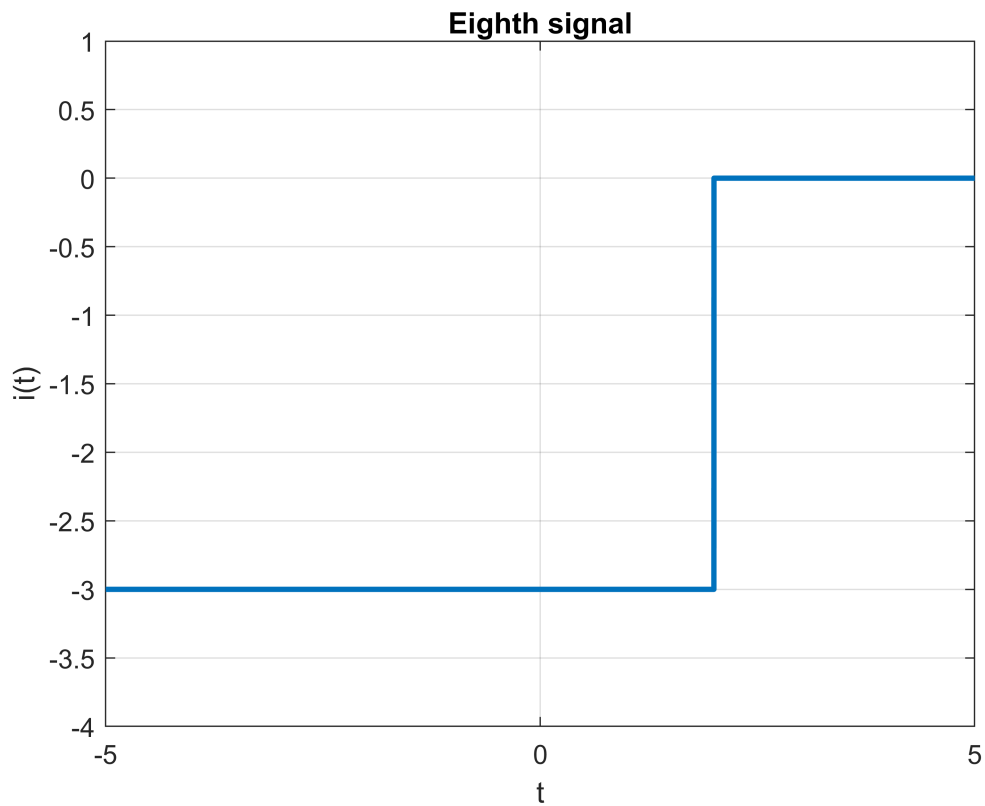
**Fifth signal**

```
%f.
clear variables;
u0 = @(t)(t>=0);
A=3;T=2;
t=-5:0.001:5;
i=-1*A*u0(t+T)+A;
plot(t,i,'LineWidth',2);
axis([min(t),max(t),min(i)-1,max(i)+1]);
xlabel('t'); ylabel('i(t)');
title('Sixth signal');
grid;
```

**Sixth signal**

```
%g.
clear variables;
u0 = @(t)(t>=0);
A=3;
t=-5:0.001:5;
i=A*u0(t)-A;
plot(t,i,'LineWidth',2);
axis([min(t),max(t),min(i)-1,max(i)+1]);
xlabel('t'); ylabel('i(t)');
title('Seventh signal');
grid;
```

Seventh signal

```
%h.
clear variables;
u0 = @(t)(t>=0);
A=3;T=2;
t=-5:0.001:5;
i=A*u0(t-T)-A;
plot(t,i,'LineWidth',2);
axis([min(t),max(t),min(i)-1,max(i)+1]);
xlabel('t'); ylabel('i(t)');
title('Eighth signal');
grid;
```

Eighth signal


```matlab
%i.
clear variables;
u0 = @(t)(t>=0);
A=3;T=2;t=-5:0.001:5;
i=A*u0(t+T)-A;
plot(t,i,'LineWidth',2);
axis([min(t),max(t),min(i)-1,max(i)+1]);
xlabel('t'); ylabel('i(t)');
title('Ninth signal');
grid;
```

Ninth signal
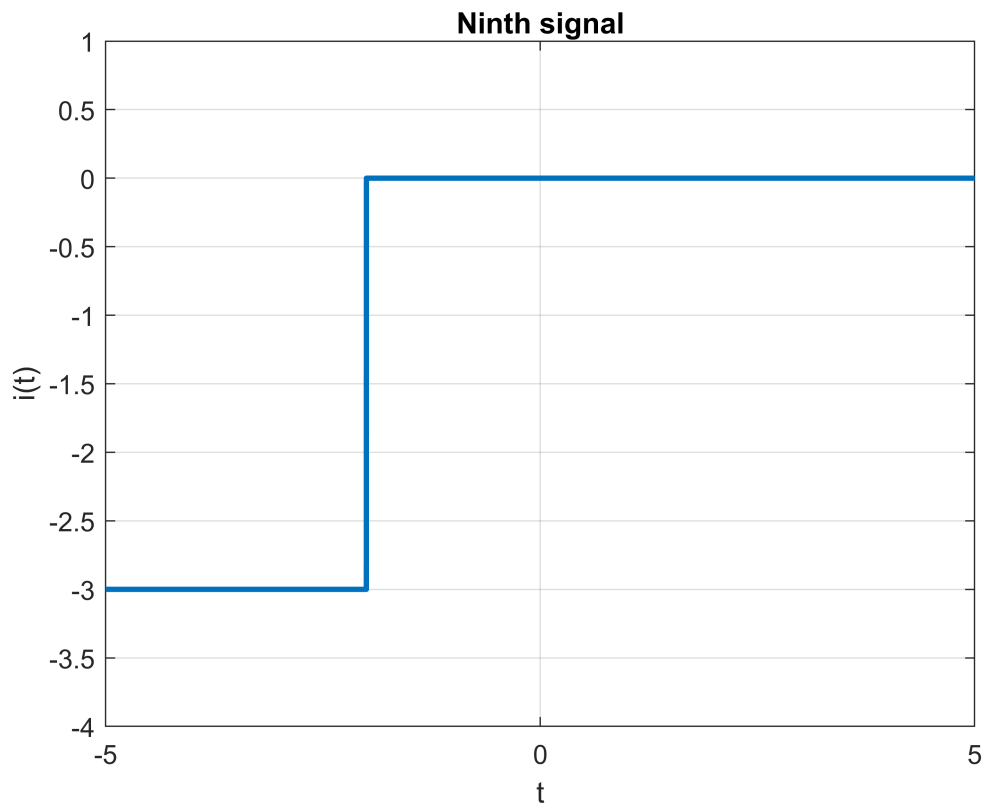
Exercise 2

a)

$$\int_{-4}^{7} \sin(\pi t)\delta(t-1)dt = \sin(\pi) = 0$$

b)

$$\int_{0}^{2} \sin(\pi t)\delta(t-3)dt = 0 \text{ directly, because } t = 3 \text{ for which } \delta(t-3) \neq 0 \text{ is not in the integration interval}$$

c) $e^{-t}\cos(10t)\delta(t) = 1$

$\delta(t) \neq 0$ and $= 1$ only when $t = 0$, for $t = 0 \rightarrow e^{-t}\cos(10t) = 1$

d) $\sin(2\pi)\sum_{k=0}^{\infty} \delta(t-k), \ k \in Z = 0$

If $t < 0, \sum_{k=0}^{\infty} \delta(t-k) = 0$

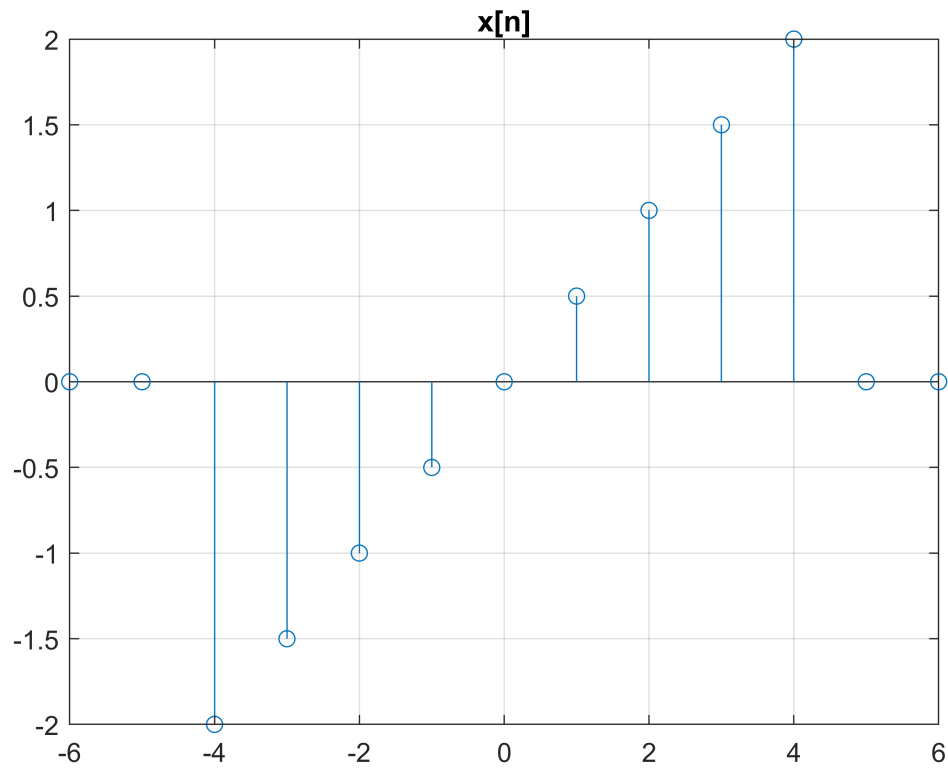If $\ t \geq 0, \sin(2\pi t) = 0$

```
%Ex3
clear variables
```

```
n = -6:6;
u0 = @(n) (n>=0);
x = @(n) ((n/2) .* u0(n+4) - u0(n-5) .* (n/2));

figure, stem(n, x(n));
title('x[n]'); grid
```
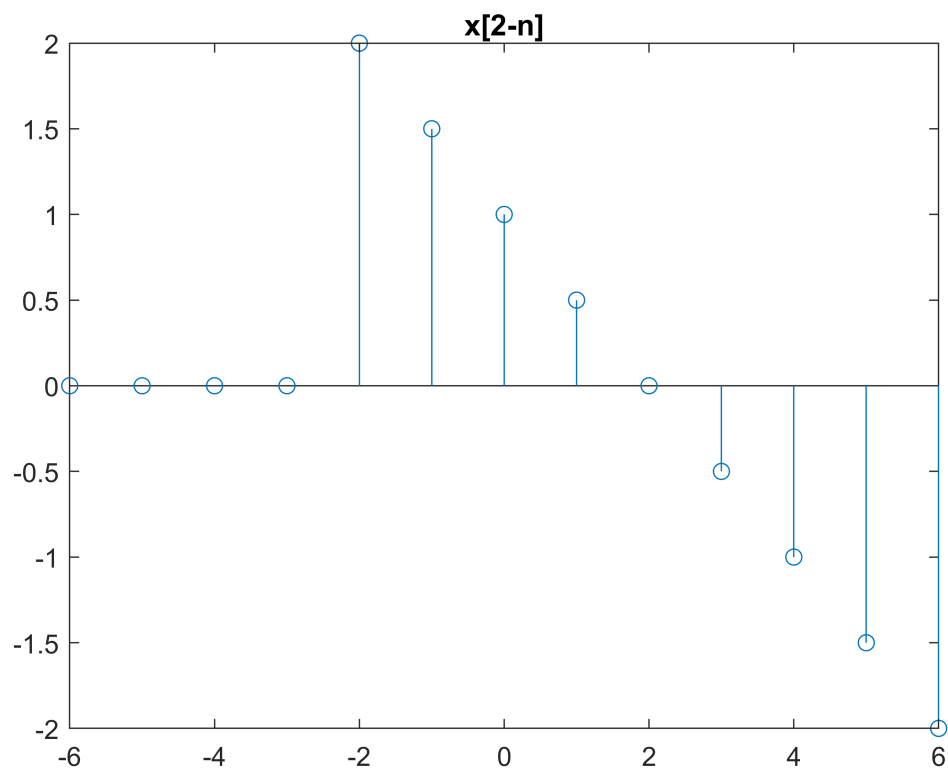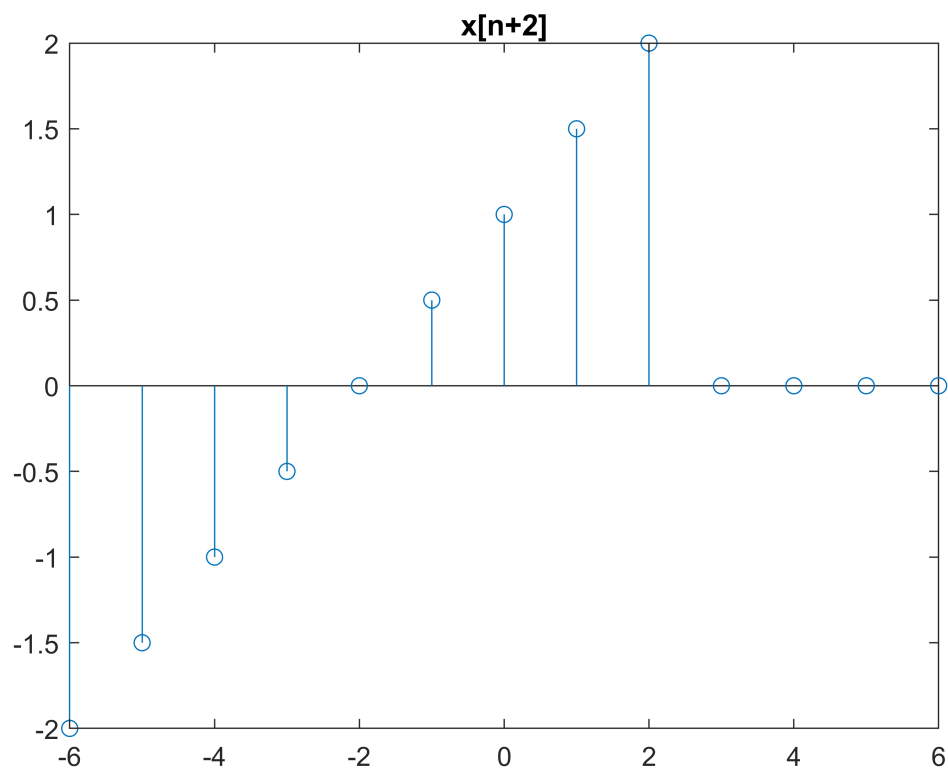

x[n]

```
%a)
stem(n,x(2-n));
title('x[2-n]');
```
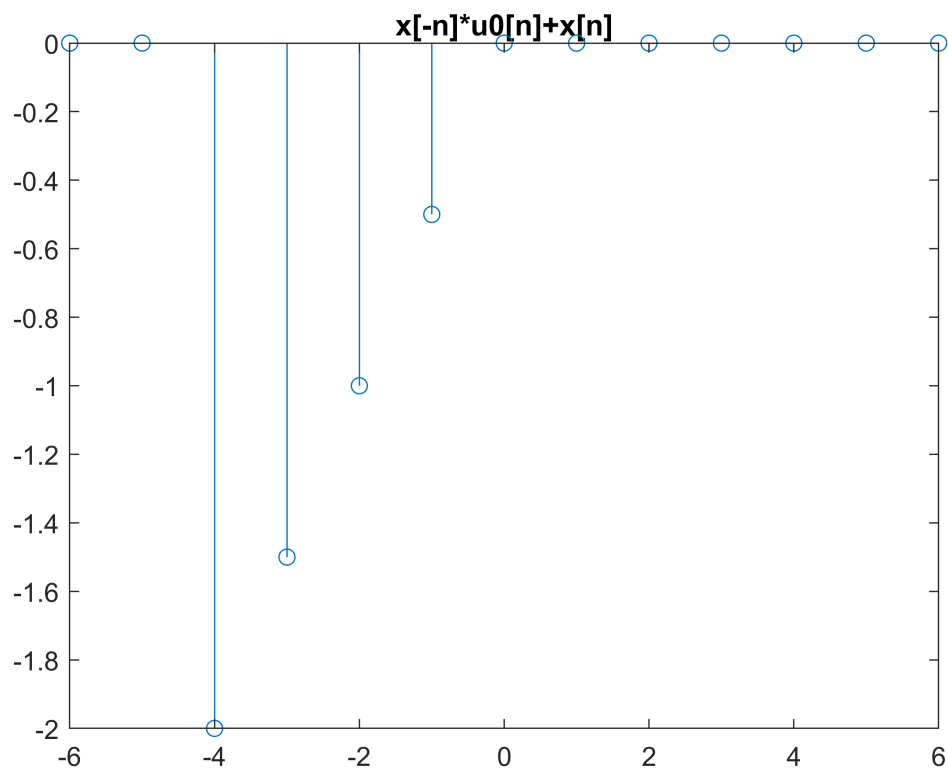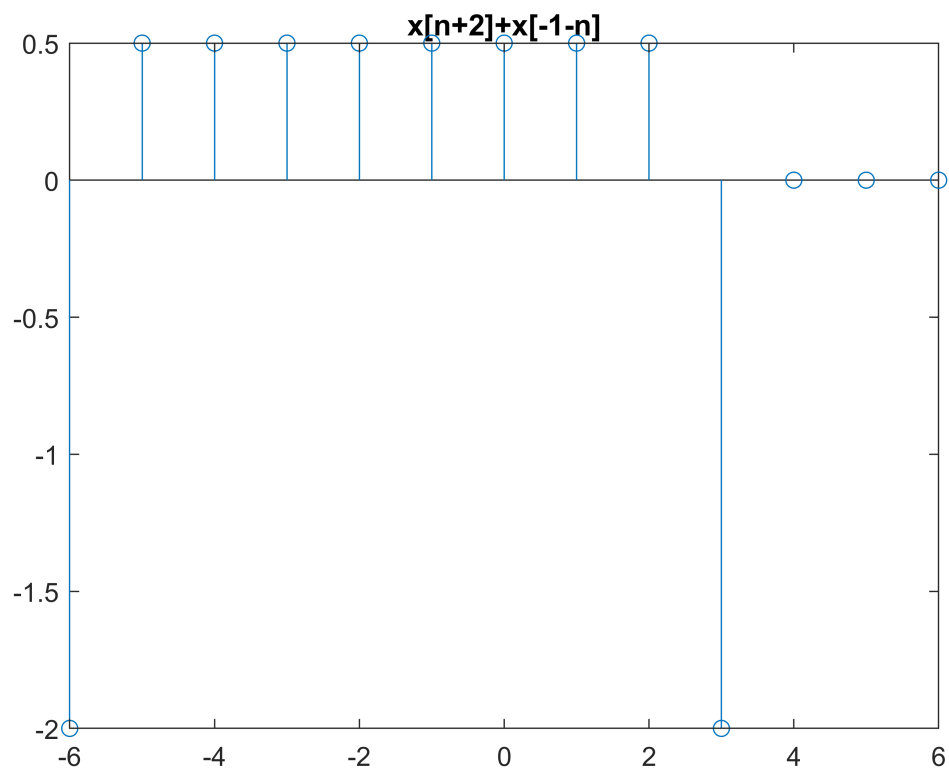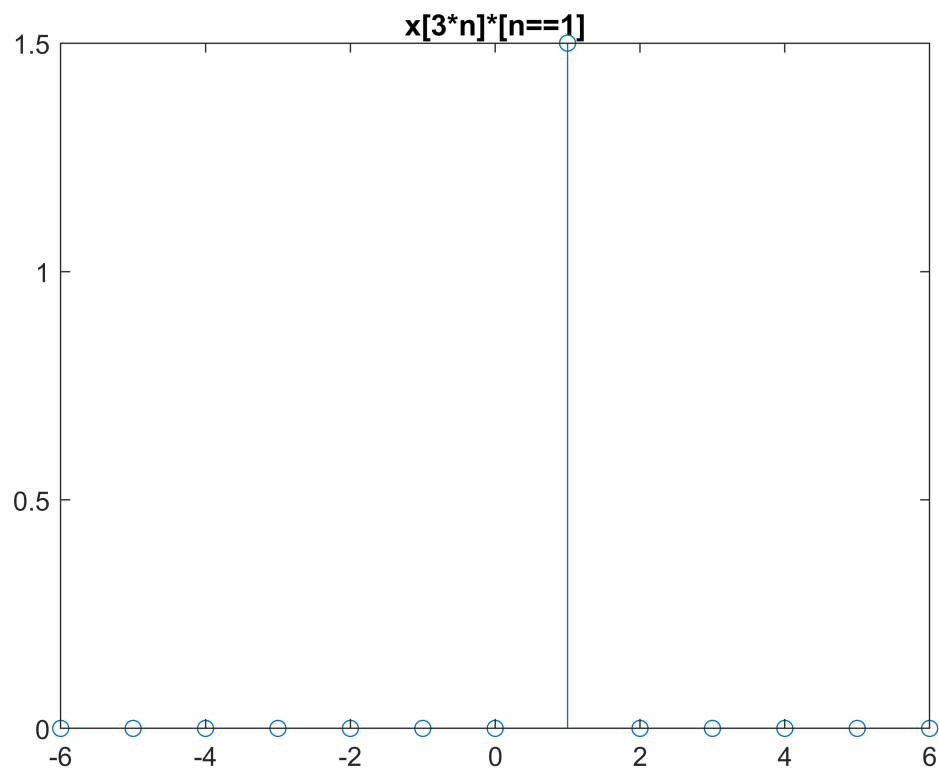
10

x[2-n]

```
%b)
stem(n,x(n+2));
title('x[n+2]');
```

x[n+2]

```
%c)
stem(n,x(-n).*u0(n)+x(n));
title('x[-n]*u0[n]+x[n]');
```
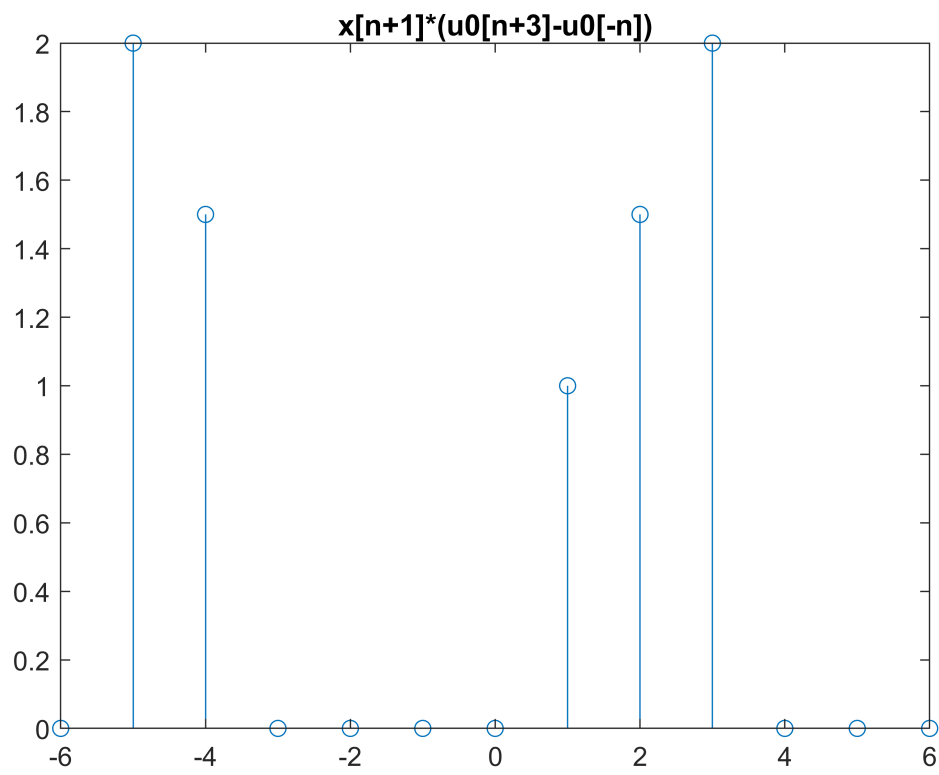
x[-n]*u0[n]+x[n]

```
%d)
stem(n,x(n+2)+x(-1-n));
title('x[n+2]+x[-1-n]');
```

x[n+2]+x[-1-n]

```
%e)
stem(n,x(3*n).*(n==1));
title('x[3*n]*[n==1]');
```

x[3*n]*[n==1]


```
%f)
stem(n,x(n+1).*(u0(n+3)-u0(-n)));
title('x[n+1]*(u0[n+3]-u0[-n])');
```

x[n+1]*(u0[n+3]-u0[-n])

```
%g)
stem(n,u0(n-4)-u0(n-3));
title('u0[n-4]-u0[n-3]');
```

u0[n-4]-u0[n-3]